

REMARKS

Entry of the foregoing, reexamination and further and favorable reconsideration of the subject application, in light of the following remarks, is respectfully requested.

By the present amendment, claims 13, 15-19, 31 and 33 have been amended to recite that the refractory metal-containing layer is unetched. Support for this amendment to the claims may be found, at the very least, on page 11, lines 10-15, of the specification as filed. No new matter enters by this amendment.

Rejection of Claims 13-22, 24, 25 and 29-35 Under 35 U.S.C. § 103(a)

Claims 13-22, 24, 25 and 29-35 have been rejected under 35 U.S.C. § 103(a) for purportedly being unpatentable over Mu *et al.* (U.S. Patent No. 4,980,018) and Olson *et al.* (U.S. Patent No. 5,705,433). For at least all of the reasons set forth below, withdrawal of this rejection is believed to be in order.

By the present amendment, the claims have been amended to recite that the refractory metal-containing layer is unetched. As noted by the Examiner in the Office Action mailed March 4, 2005, the specification provides support for newly-formed (*i.e.* unetched) refractory metal. (*See* Page 5, lines 1-3, of the Office Action mailed March 4, 2005). Since the unetched refractory metal-containing layer is the first layer to be etched by the method of the present invention, and the first etchant chemistry is used to conduct this etching, the claims as amended make clear that the refractory metal-containing layer is not etched prior to etching with the first etchant chemistry.

As noted previously, the first etchant chemistry of the present invention requires a chlorine source and a fluorine source, but is free from BCl₃. This is completely different

from what Mu *et al.* discloses. In contrast to the present invention, the first etchant of Mu *et al.* **contains substantially no Cl_2** . See, e.g., Mu *et al.*, column 3, lines 41-43, column 6, lines 21-22, column 9, lines 8-10, column 10, lines 7-10 (Claim 1 therein), and column 11, lines 43-46. In order for Mu *et al.* to read on the present claims, the second step of Mu *et al.* should somehow be used as the first step. However, this would be improper because it would ignore express claim limitations and it would be a piecemeal interpretation of the cited reference. It is well established that the Patent Office must consider all claim limitations, and the Office must consider a reference in its entirety. Thus, Mu *et al.* fails to teach a method of etching a semiconductor device having a plurality of layers, including a layer comprising an unetched refractory metal-containing material, wherein the first etching step etches the unetched refractory metal-containing layer with a first etching chemistry which comprises a chlorine source free of BCl_3 and a fluorine source.

Olson *et al.* does not solve the deficiencies of Mu *et al.* Olson *et al.* makes no suggestion of a method of etching a semiconductor device having a plurality of layers, including a layer comprising an unetched refractory metal-containing material, wherein the first etching step etches the unetched refractory metal-containing layer with a first etching chemistry which comprises a chlorine source free of BCl_3 and a fluorine source. Furthermore, the Examiner refers to the table at the bottom of column 3 of Olson *et al.* as providing appropriate power levels for etching a refractory metal-containing material. However, this table merely provides appropriate conditions for etching silicon containing metals (which may not contain any refractory metal). As seen in Example 1, where a refractory metal-containing material (tungsten silicide) is etched, a source power of 700

watts and a bias power of 100 watts were used. Olson *et al.*'s only teaching with respect to etching a refractory metal-containing material is that the source power should be 700 watts and the bias power should be 100 watts. The 700 watts of source power falls outside of the range of the present claims. Thus, Olson *et al.* clearly does not solve the deficiencies of Mu *et al.*, and even if taken together these two references would not teach or suggest the claimed invention.

In light of these remarks, Applicant respectfully requests withdrawal of this rejection under 35 U.S.C. § 103(a).

Rejection of Claims 23 and 26-28 Under 35 U.S.C. § 103(a)

Claims 23 and 26-28 have been rejected under 35 U.S.C. § 103(a) for purportedly being unpatentable over Mu *et al.* and Olson *et al.* and further in view of Roberts *et al.* (U.S. Patent No. 5,626,775). For at least all of the reasons set forth below, withdrawal of this rejection is believed to be in order.

As noted above, neither Mu *et al.* nor Olson *et al.*, whether taken alone or together, teach or suggest a method of etching a semiconductor device having a plurality of layers, including a layer comprising an unetched refractory metal-containing material, wherein the first etching step etches the unetched refractory metal-containing layer with a first etching chemistry which comprises a chlorine source free of BCl₃ and a fluorine source. Roberts *et al.* does not solve the deficiencies of Mu *et al.* and Olson *et al.* and therefore, even if the references were taken together, they would not teach or suggest the claimed invention.

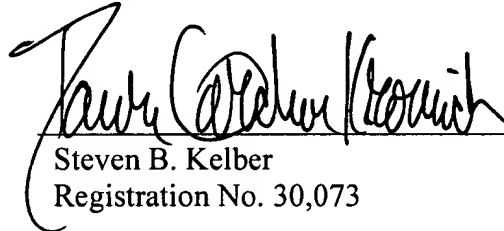
In light of these remarks, Applicant respectfully requests withdrawal of this rejection under 35 U.S.C. § 103(a).

CONCLUSION

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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October 19, 2005

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